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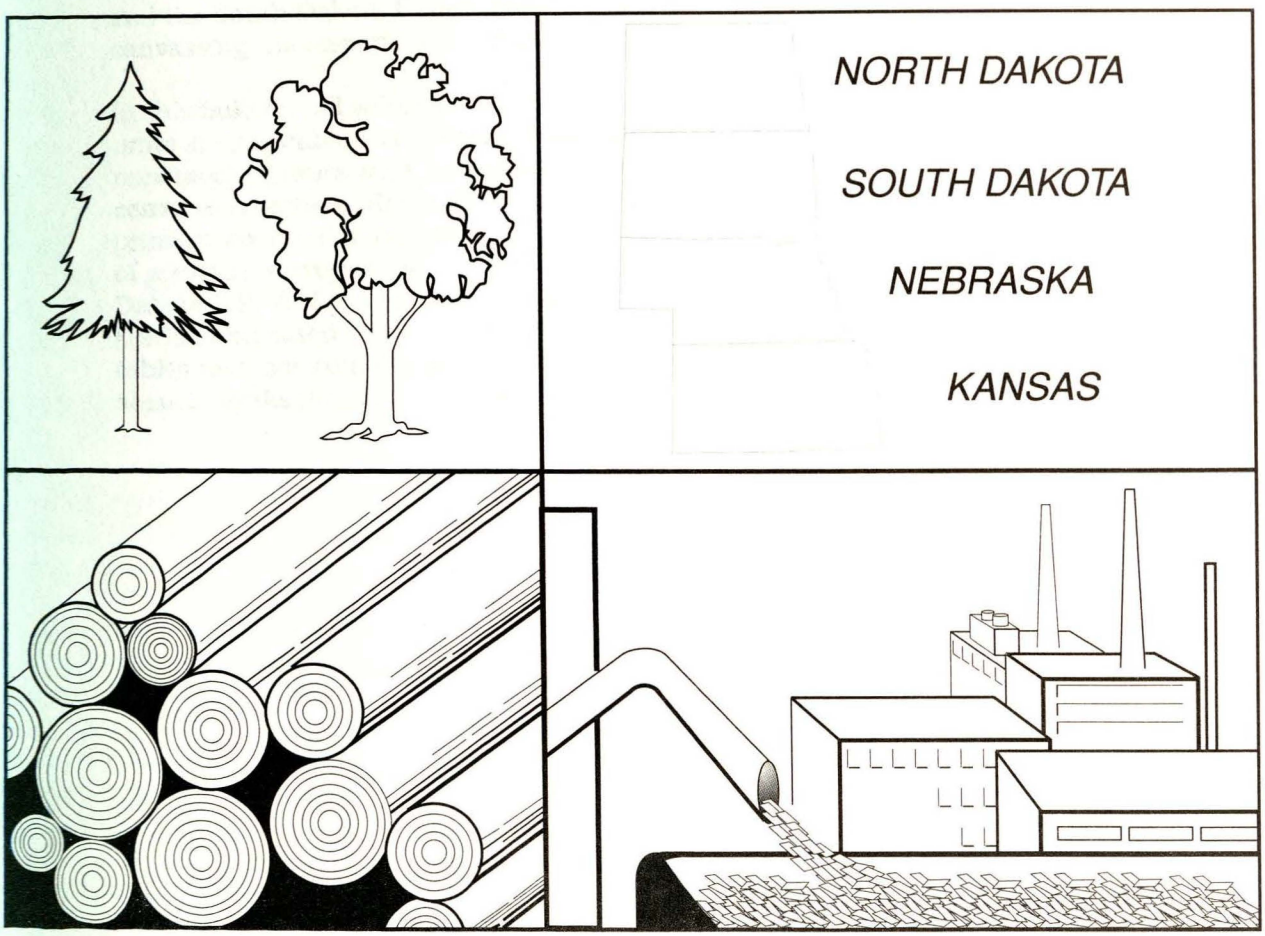
Plains States Timber Industry - An Assessment of Timber Product Output and Use, 1993

Dennis M. May



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FOREWORD

This bulletin reports findings of a survey of all primary wood-using mills in the Plains States in 1993, and details the industry's size and composition, its use of roundwood, and its generation and disposition of wood residues. Such detailed information is necessary for intelligent planning and decisionmaking in wood procurement, forest resource management, forest industry development, and forest research.

Special thanks are given to the primary wood-using firms that responded to the survey and to Kansas State and Extension Forestry—Kansas State University, the Nebraska Forest Service, the North Dakota Forest Service, and the South Dakota Department of Agriculture-Division of Forestry for canvassing the respondents. Their cooperation is greatly appreciated.

In this bulletin, all volumes are reported in product-specific standard units and/or cubic feet. When necessary, volumes reported by mills in nonstandard units were converted to standard units using regional conversion factors. Reported trends and changes in the Plains States primary wood-using industry are based on comparisons with a composite of previous surveys conducted in Kansas (1980), Nebraska (1980), North Dakota (1977), Eastern South Dakota (1979), and Western South Dakota (1983), and dated 1980 for reporting purposes. Row and column data of tables may not sum due to rounding, but data in each table cell are accurately displayed.

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Plains States Timber Industry—An Assessment of Timber Product Output and Use, 1993

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HIGHLIGHTS

PRIMARY WOOD-USING INDUSTRY

- In 1993, there were 101 primary wood-using mills operating in the Plains States (fig. 1). Most of these mills (70 percent) were small sawmills that processed less than 1 million board feet of saw logs per year (table 1).
- Although numbers of mills have declined in both Kansas and Nebraska since 1980 (fig. 2), 70 percent of the region's mills are still located in these two States.
- Overall, the number of primary wood-using mills operating in the Plains States has declined by 35 mills, or 26 percent, since 1980.

INDUSTRIAL ROUNDWOOD RECEIPTS

- In 1993, the 101 active mills in the Plains States received almost 24 million cubic feet of roundwood for processing into primary wood products (table 2).
- Sawmills processed 94 percent of the roundwood receipts into lumber, pallets, planking, and lath. The remainder was processed into a variety of other products (animal bedding, box veneer, cabin logs, fence posts, and particle board) by the region's 10 specialty mills.
- Two species, ponderosa pine and cottonwood, accounted for nine-tenths of the volume processed; ponderosa pine alone accounted for 63 percent of the total.
- South Dakota's 18 mills processed three-fifths of the region's industrial roundwood receipts and 94 percent of the region's ponderosa pine receipts (table 3).

Figure 1.—*The Plains States.*

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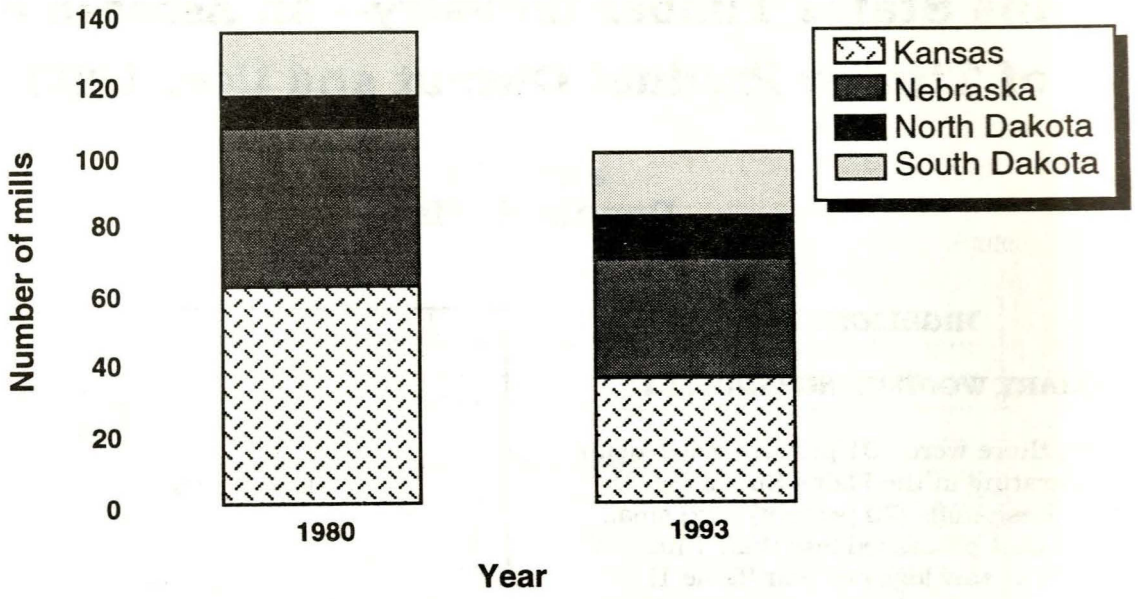


Figure 2.—*Number of active primary wood-using mills, Plains States, 1980 and 1993.*

- Nebraska, with nearly twice as many mills as South Dakota, processed only about half as much of the region's industrial roundwood receipts, but processed 86 percent of the region's cottonwood receipts.

- Together, South Dakota and Nebraska processed 89 percent of the region's industrial roundwood receipts in 1993.

INDUSTRIAL ROUNDWOOD PRODUCTION

- In 1993, 25 million cubic feet of industrial roundwood products were cut from Plains States' forests (table 4), 22 percent less than in 1980.

- Reduced harvests of ponderosa pine saw logs from South Dakota and hardwood saw logs from Kansas caused most of the decline in industrial roundwood production since 1980, despite the partially offsetting effect of increased harvests of ponderosa pine and cottonwood saw logs from Nebraska (fig. 3).

- Despite the decline in production, saw logs remained the predominant roundwood product harvested from the region's forests, accounting for 95 percent of the roundwood harvest.

- Nine-tenths of the region's industrial roundwood production was concentrated in two States, South Dakota and Nebraska (table 5). More than half (54 percent) of the regional production was harvested from South Dakota alone.

- Two species, ponderosa pine and cottonwood, accounted for 89 percent of the volume harvested (table 6); ponderosa pine alone accounted for two-thirds of the total.

- Four-fifths of the region's ponderosa pine harvest was cut from South Dakota, and Nebraska supplied almost all of the remainder.

- Nebraska's forests also supplied four-fifths of the region's cottonwood production in 1993.

INDUSTRIAL ROUNDWOOD MOVEMENT

- One-quarter of the Plains States' production, 6.5 million cubic feet, was exported out of the region for processing in 1993. Most (97 percent) of the exported volume was in the form of saw logs (table 7).

- The Plains States supplied four-fifths of the roundwood volume processed by its mills in 1993; the rest, 4.9 million cubic feet, was imported from surrounding States.

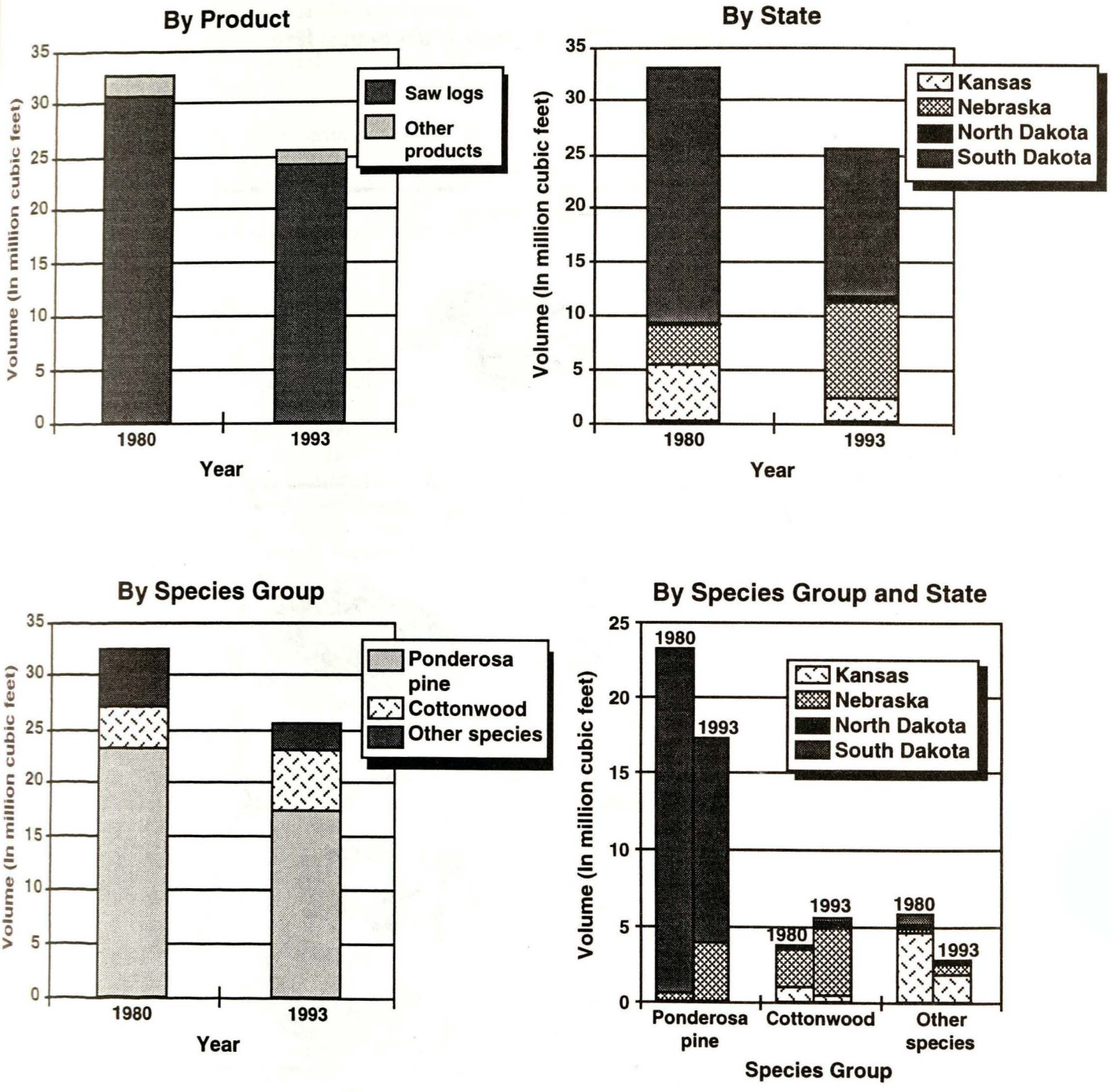
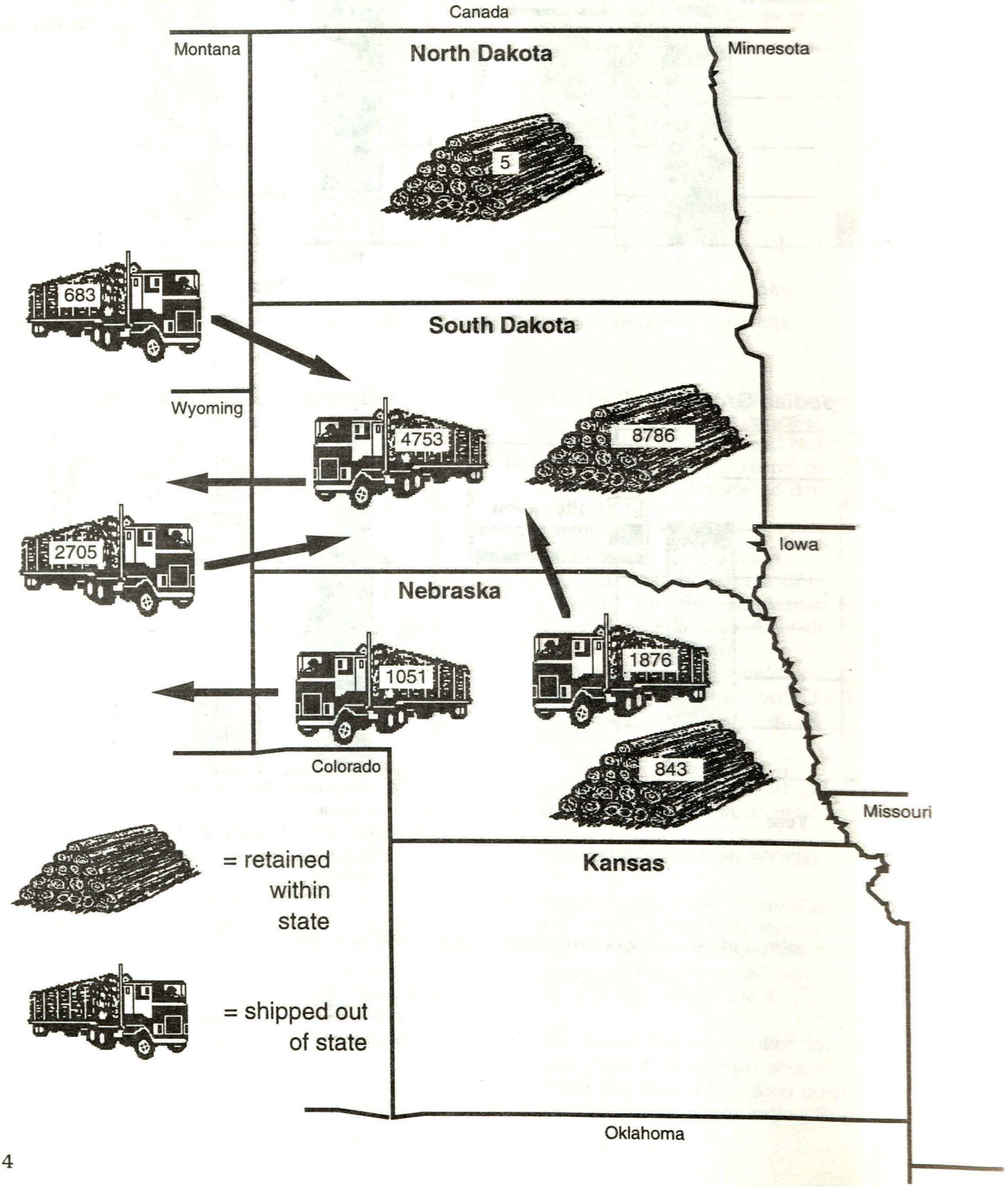


Figure 3.—*Industrial roundwood production, Plains States, 1980 and 1993.*

Figure 4.—*Movement of ponderosa pine roundwood by State, Plains States, 1993.*

(In thousand cubic feet)



- Ponderosa pine was by far the most mobile species, accounting for 89 percent of the region's export volume and 69 percent of its import volume (table 8).

- Due mostly to the movements of ponderosa pine, Wyoming was the Plains States' largest roundwood trading partner in 1993, receiving nine-tenths of the region's exports and sending 57 percent of the region's imports (table 9).

- Although South Dakota's production of ponderosa pine has fallen by 41 percent since 1980, South Dakota still remains the region's hub of ponderosa pine harvesting and processing activity (fig. 4). What has changed considerably since 1980 is Nebraska's role in supplying ponderosa pine. Nebraska has gone from producing less than 0.5 million cubic feet of pine for local processing in 1980, to being a regional resource in 1993, supplying 3.8 million cubic feet to mills in South Dakota, Wyoming, and Nebraska.

- Nebraska was also the Plains States' hub of cottonwood harvesting and processing in 1993 (fig. 5). Nebraska mills drew cottonwood from most of its neighboring States. Iowa was the largest supplier.

- Several other hardwood species—black walnut and oaks—also had considerable movement into and out of the region in 1993. Missouri was the Plains States' largest trading partner in these species, receiving four-fifths of the region's exports and supplying three-quarters of the region's imports of these species. Most of the imports from Missouri were black walnut logs headed for Kansas mills.

- Overall, the Plains States region was a net exporter of roundwood, exporting 1.6 million cubic feet more than it imported.

TIMBER REMOVALS FOR INDUSTRIAL ROUNDWOOD

- In the process of harvesting industrial roundwood, just over 37 million cubic feet of woody material were removed from Plains States' forests in 1993 (table 10).

- Two-thirds of this volume was extracted for use as roundwood products; the rest was left on the ground as harvest residue (fig. 6).

- Of the volume left on the ground, about three-quarters was in tops and cull material (logging slash), and the rest (logging residues) came from the central stem of growing-stock trees.

- As might be expected in an industry dominated by sawmills, removals from sawtimber trees supplied most of the volume for industrial roundwood products. However, some product volume was still extracted from poletimber and from non-growing-stock sources such as cull and dead trees, forks and large limbs, stumps, and tops.

- In total, three-quarters of the woody material removed came from growing-stock sources (sawtimber, poletimber and logging residues) (fig. 6).

- Together, industrial roundwood extraction and the resulting generation of logging residues removed 27 million cubic feet of growing-stock volume from the timberland inventory of the Plains States in 1993 (table 10).

- Two species, ponderosa pine and cottonwood, accounted for nine-tenths of the growing-stock removals in 1993; ponderosa pine alone accounted for two-thirds of the total.

- About half of the region's timber removals occurred in South Dakota in 1993; another 38 percent of the region's total occurred in Nebraska (table 11). However, due to the generally poorer utilization of hardwoods, both States produced similar quantities of harvest residues in 1993.

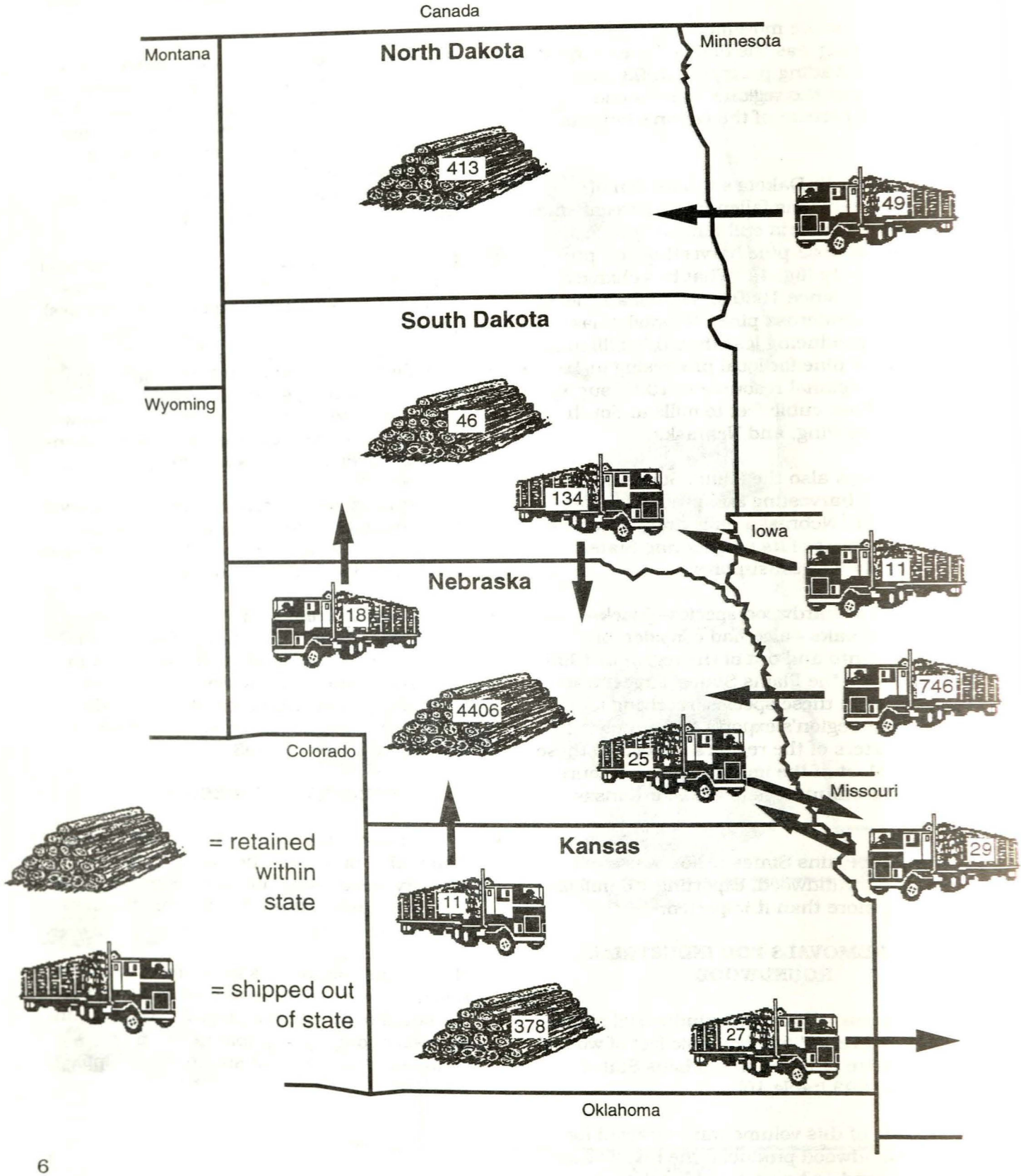
PRIMARY MILL RESIDUES

- In the conversion of industrial roundwood into milled products, the Plains States' primary wood-using industry generated close to 360 thousand green tons of mill residues (table 12).

- Half of this volume was in the form of coarse residues, such as slabs and edgings, which are suitable for chipping (fig. 7). The remainder was about equally split between fine residues, which are not suitable for chipping, and bark.

Figure 5.—*Movement of cottonwood roundwood by State, Plains States, 1993.*

(In thousand cubic feet)



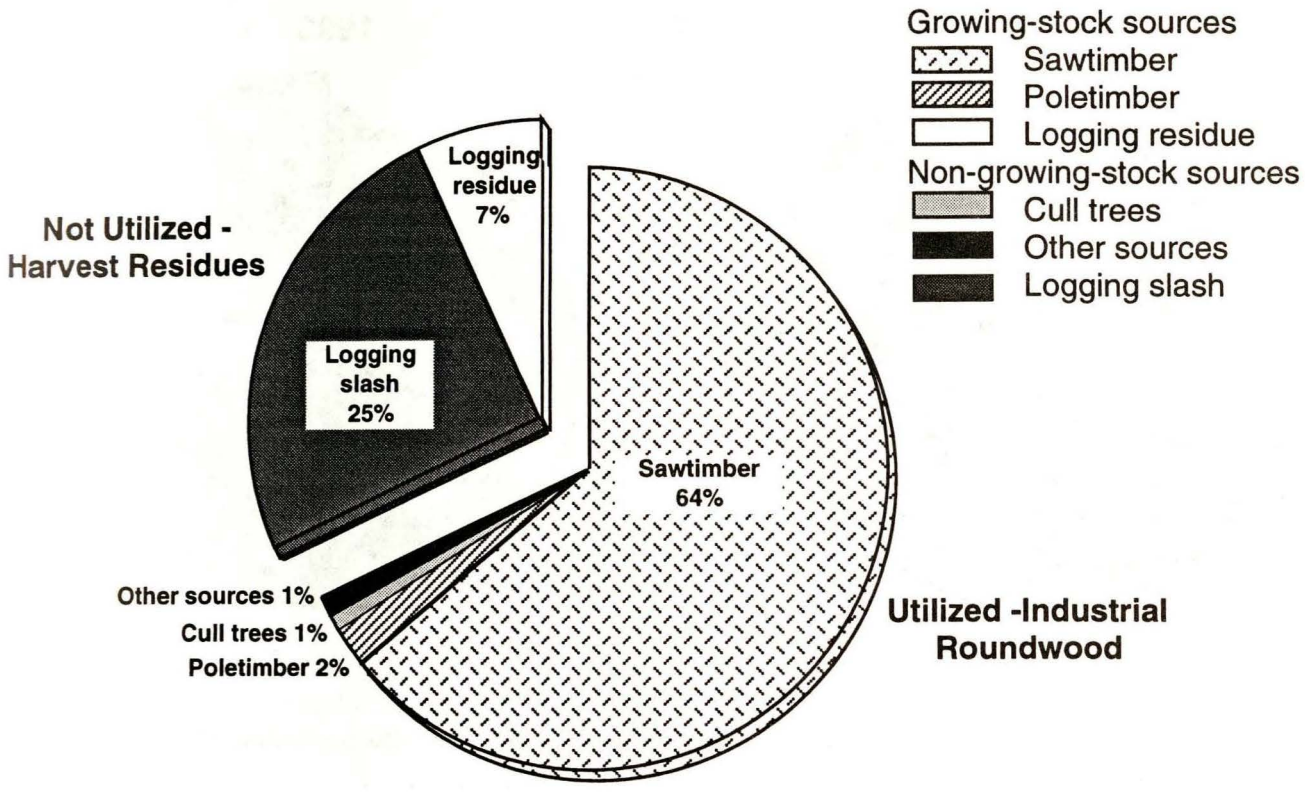


Figure 6.—*Distribution of timber removals for industrial roundwood by source of material, Plains States, 1993.*

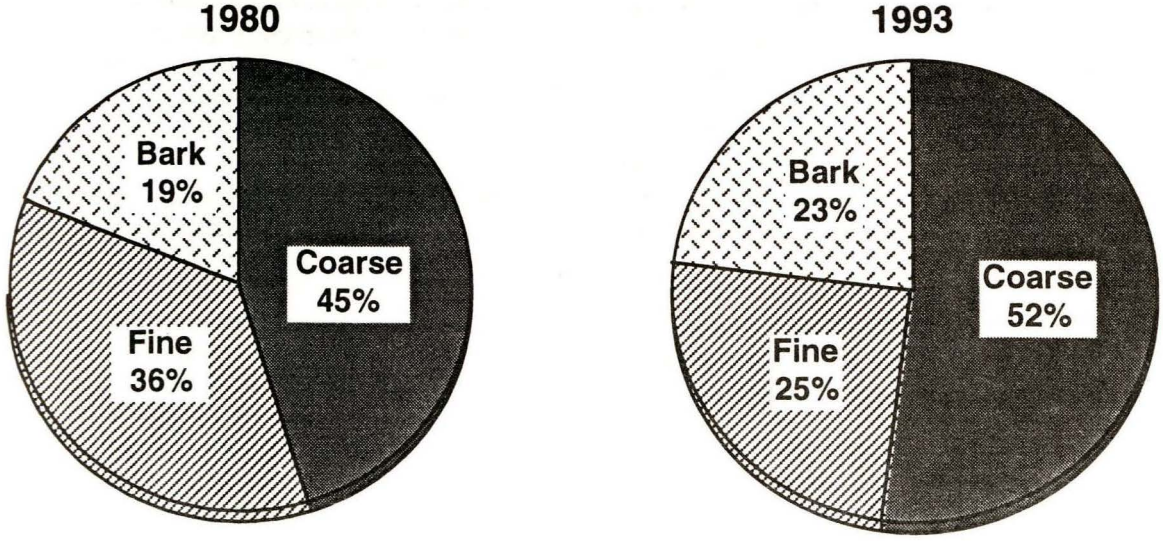


Figure 7.—*Distribution of residues generated by primary wood-using mills by type of residue, Plains States, 1980 and 1993.*

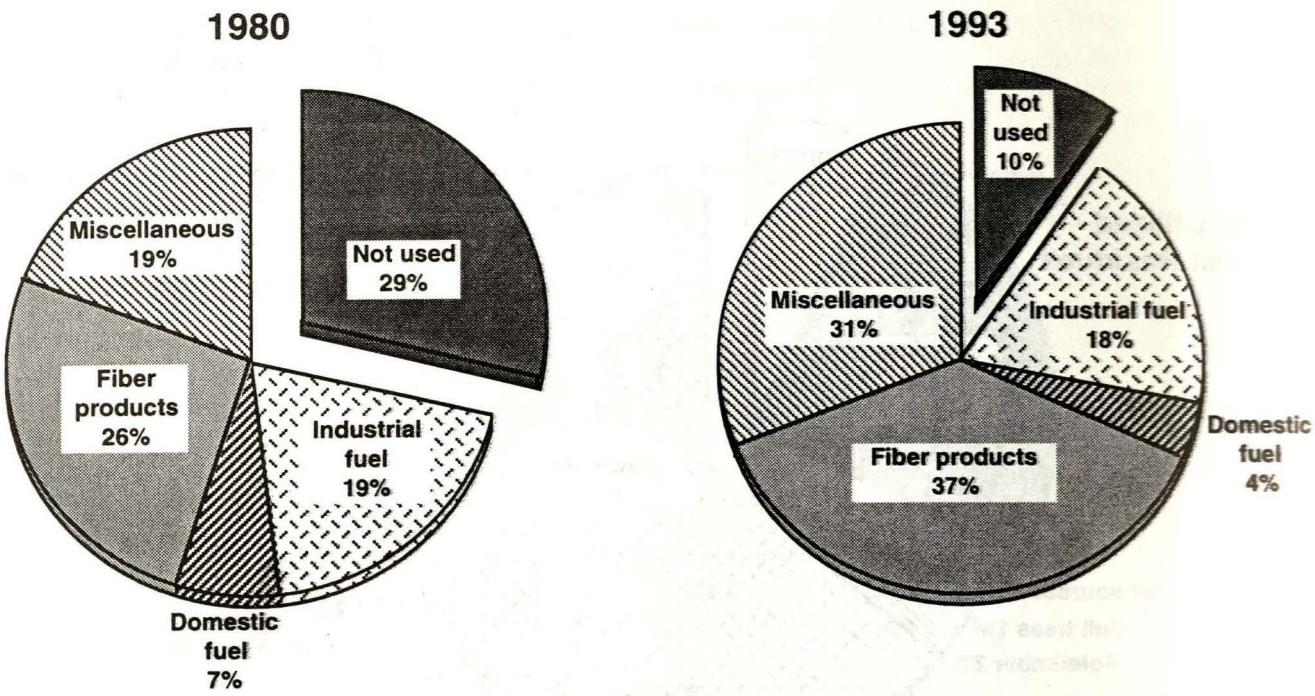


Figure 8.—*Distribution of residues generated by primary wood-using mills by method of disposal, Plains States, 1980 and 1993.*

- Nine-tenths of the mill residues generated in 1993 were used (fig. 8).
- In general, most coarse residues (58 percent) were used for fiber products; most fine residues (52 percent) were used for miscellaneous products, such as bedding, litter, mulch, or fuel pellets; and most bark (55 percent) was used as industrial fuel.
- Three-quarters of the mill residues used for industrial fuel were burned at the mills at which they were generated; the rest was sold to other mills before being burned.
- Although 10 percent of mill residues remained unused in 1993, this is a vast improvement in utilization from 1980 when 29 percent of the region's mill residues went unused.
- In 1993, South Dakota mills generated 56 percent of the region's mill residues, and Nebraska mills contributed a third (fig. 9). This is in sharp contrast to 1980 when South Dakota mills alone produced three-quarters of the region's mill residues.
- More than half (53 percent) of the unused residues generated in 1993 were in Nebraska, and another 37 percent were located in South Dakota.

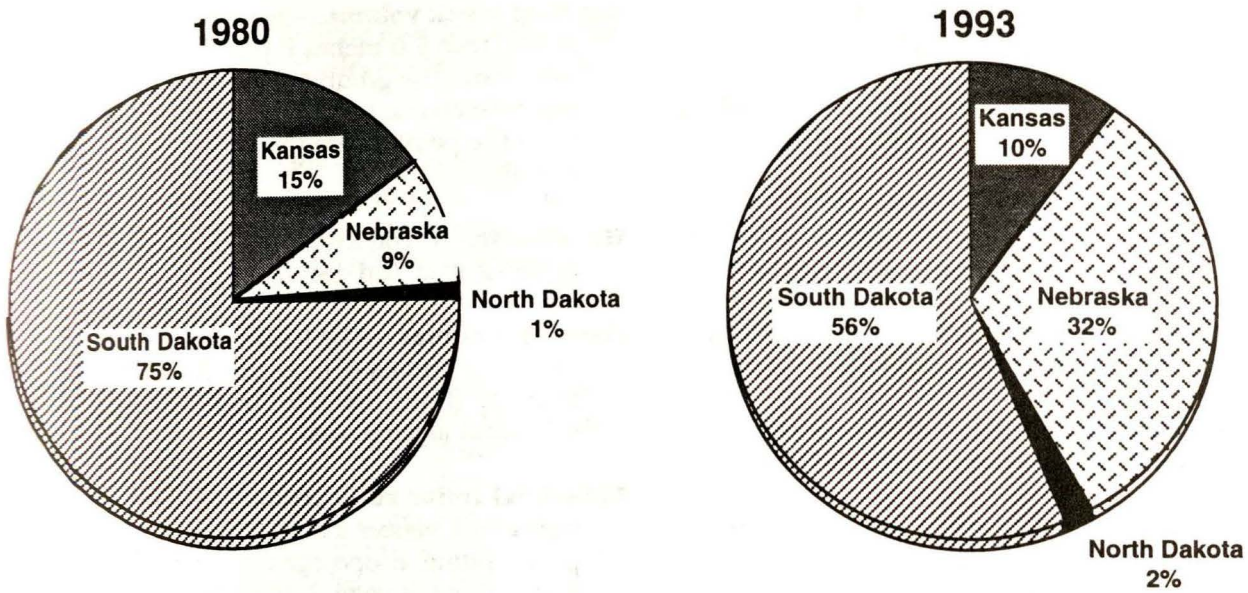


Figure 9.—*Distribution of residues generated by primary wood-using mills by State, Plains States, 1980 and 1993.*

APPENDIX

STUDY METHODS

This study was a cooperative effort of the Kansas State and Extension Forestry—Kansas State University, the Nebraska Forest Service, the North Dakota Forest Service, the South Dakota Department of Agriculture-Division of Forestry, and the North Central Forest Experiment Station (NCFES). Using mail questionnaires supplied by NCFES and designed to determine the size and composition of a State's primary wood-using industry, its use of roundwood, and its generation and disposition of wood residues, each State forestry agency canvassed all primary wood-using mills in its jurisdiction. Followups to nonresponding mills using additional mailings, telephone, and personal contacts were made by each State forestry agency until a 100-percent response was achieved. Completed questionnaires were sent to NCFES for editing and processing.

As part of data editing and processing, all industrial roundwood volumes reported on the questionnaires were converted to standard units of measure using regional conversion factors. Timber removals by source of material and harvest residues generated during logging were estimated from standard product volumes using factors developed from logging utilization studies previously conducted by NCFES. Finalized data on Plains States' industrial roundwood receipts were loaded into a regional timber removals database and supplemented with data on out-of-State uses of Plains States' roundwood to provide a complete assessment of Plains States' timber product output.

DEFINITION OF TERMS

Board foot.—Unit of measure applied to roundwood. It relates to lumber that is 1 foot long, 1 foot wide, and 1 inch thick (or its volume equivalent).

Central stem.—The portion of a tree between a 1-foot stump and the minimum 4.0-inch top diameter outside bark or the point where the central stem breaks into limbs.

Coarse mill residue.—Wood residue suitable for chipping such as slabs, edgings, and veneer cores.

Commercial species.—Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam, Osage-orange, and redbud.)

Cull removals.—Net volume of rough and rotten trees, plus the net volume in sections of the central stem of growing-stock trees that do not meet regional merchantability standards, harvested for industrial roundwood products.

Dead removals.—Net volume of dead trees harvested for industrial roundwood products.

Diameter at breast height (d.b.h.).—The outside bark diameter at 4.5 feet above the forest floor on the uphill side of the tree. For determining breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line.

Fine mill residue.—Wood residue not suitable for chipping such as sawdust and veneer clippings.

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparing specified standards with basal area and/or number of trees, age or size, and spacing.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 feet wide.

Growing-stock removals.—The growing-stock volume removed from the timberland inventory by harvesting industrial roundwood products. (Note: Includes sawtimber removals, poletimber removals, and logging residues.)

Growing-stock tree.—A live timberland tree of commercial species that meets specified standards of size, quality, and merchantability. (Note: Excludes rough, rotten, and dead trees.)

Growing-stock volume.—Net volume of growing-stock trees 5.0 inches d.b.h. and over, from 1 foot above the ground to a minimum 4.0-inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs.

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous.

Harvest residues.—The total net volume of unused portions of trees cut or killed by logging. (Note: Includes both logging residues and logging slash.)

Industrial roundwood products.—Saw logs, pulpwood, veneer logs, poles, commercial posts, piling, cooperage logs, particle board bolts, shaving bolts, lath bolts, charcoal bolts, and chips from roundwood used for fuel, pulp, or board products.

Industrial roundwood production.—The quantity of industrial roundwood harvested in a geographic area.

Industrial roundwood receipts.—The quantity of industrial roundwood received by commercial mills in a geographic area.

International 1/4-inch rule.—A log rule or formula for estimating the board foot volume of logs, allowing 1/2 inch of taper for each 4-foot length. The rule appears in a number of forms that allow for kerf. In this form, a 1/4-inch of kerf is assumed. This rule is used as the USDA Forest Service standard log rule in the Eastern United States.

Limbwood removals.—Net volume of all portions of a tree other than the central stem, (including forks, large limbs, tops, and stumps) harvested for industrial roundwood products.

Logging residue.—Net volume of unused portions of the merchantable central stem of growing-stock trees cut or killed by logging.

Logging slash.—Net volume of unused portions of the unmerchantable (non-growing-stock) sections of trees cut or killed by logging.

Merchantable sections.—Sections of the central stem of growing-stock trees that meet either pulpwood or saw-log specifications.

Net volume.—Gross volume less deductions for rot, sweep, or other defects affecting use for roundwood products.

Noncommercial species.—Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial roundwood products. Classified in volume tables as rough trees.

Nonforest land.—Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, power-line clearings of any width, and 1- to 39.9-acre areas of water classified by the Bureau of the Census as land. If intermingled in forest areas, improved roads and nonforest strips must be more than 120 feet wide and more than 1 acre to qualify as nonforest land.)

Nonforest land removals.—Net volume of trees on nonforest lands harvested for industrial roundwood products.

Poletimber.—A growing-stock tree at least 5.0 inches d.b.h. but smaller than sawtimber size (9.0 inches d.b.h. for softwoods, 11.0 inches d.b.h. for hardwoods).

Poletimber removals.—Net volume in the merchantable central stem of poletimber trees harvested for industrial roundwood products.

Primary wood-using mills.—Mills receiving roundwood or chips from roundwood for processing into products.

Primary wood-using mill residue.—Wood materials (coarse and fine) and bark generated at manufacturing plants from roundwood processed into principal products. These residues include wood products (byproducts) obtained incidental to production of principal products and wood materials not utilized for some byproduct.

Rotten tree.—A tree that does not meet regional merchantability standards because of excessive unsound cull.

Rough tree.—A tree that does not meet regional merchantability standards because of excessive sound cull. Includes noncommercial tree species.

Roundwood.—Logs, bolts, or other round sections cut from trees (including chips from roundwood).

Sapling.—A live tree between 1.0 and 5.0 inches d.b.h.

Sapling removals.—Net volume in saplings harvested for industrial roundwood products.

Saw-log portion.—That portion of the central stem of sawtimber trees between the stump and the saw-log top.

Saw-log top.—The point on the central stem of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber removals.—Net volume in the merchantable central stem of sawtimber trees harvested for industrial roundwood products. (Note: Includes the saw-log and upper-stem portions of sawtimber trees.)

Sawtimber tree.—A growing-stock tree containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting regional specifications for freedom from defect. Softwoods must be at least 9.0 inches d.b.h. and hardwoods must be at least 11.0 inches d.b.h.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Tree.—A woody plant usually having one or more perennial stems, a more or less definitely formed crown of foliage, and a height of at least 12 feet at maturity.

Timberland.—Forest land that is producing, or is capable of producing, in excess of 20 cubic feet per acre per year of industrial roundwood products under natural conditions, is not withdrawn from timber utilization by statute or administrative regulation, and is not associated with urban or rural development.

Timber product output.—The volume of roundwood products produced from an area's forests.

Timber removals.—The total net volume of trees removed for industrial roundwood products or left on the ground as harvest residues.

Upper stem portion.—That portion of the central stem of sawtimber trees between the sawlog top and the minimum top diameter of 4.0 inches outside bark or the point where the central stem breaks into limbs.

Veneer log.—Logs to be used in the production of plywood, finished panels, or veneer sheets, both rotary cut and sliced.

SPECIES GROUP, COMMON, AND SCIENTIFIC NAMES OF TREE SPECIES MENTIONED

SOFTWOODS

Redcedar
- Rocky Mountain juniper . *Juniperus scopulorum*
- Eastern redcedar ..... *Juniperus virginiana*

Spruce
- Engelmann spruce[1] ..... *Picea engelmannii*
- White spruce ..... *Picea glauca*

Ponderosa pine ..... *Pinus ponderosa*

Other pines
- Lodgepole pine[1] ..... *Pinus contorta*
- Western white pine[1] ..... *Pinus monticola*

Other softwoods
- Western larch[1] ..... *Larix occidentalis*

HARDWOODS

Soft maple
- Boxelder ..... *Acer negundo*
- Silver maple ..... *Acer saccharinum*

Hard maple
- Sugar maple ..... *Acer saccharum*

River birch ..... *Betula nigra*

Hickory
- Bitternut hickory ..... *Carya cordiformis*
- Shellbark hickory ..... *Carya laciniosa*
- Shagbark hickory ..... *Carya ovata*
- Black hickory ..... *Carya texana*
- Mockernut hickory ..... *Carya tomentosa*

Pecan ..... *Carya illinoensis*

Hackberry ..... *Celtis occidentalis*

Ash
- White ash ..... *Fraxinus americana*
- Green ash ..... *Fraxinus pennsylvanica*

Honeylocust ..... *Gleditsia triacanthos*

Black walnut ..... *Juglans nigra*

Osage-orange ..... *Maclura pomifera*

Sycamore ..... *Platanus occidentalis*

Cottonwood
- Eastern cottonwood ..... *Populus deltoides*
- Plains cottonwood ..... *Populus deltoides var. occidentalis*

Aspen
- Quaking aspen ..... *Populus tremuloides*

Black cherry ..... *Prunus serotina*

Red oak
- Northern red oak ..... *Quercus rubra*
- Black oak ..... *Quercus velutina*
- Blackjack oak ..... *Quercus marilandica*
- Shumard oak ..... *Quercus shumardii*
- Shingle oak ..... *Quercus imbricaria*
- Pin oak ..... *Quercus palustris*

White oak
- White oak ..... *Quercus alba*
- Bur oak ..... *Quercus macrocarpa*
- Chinkapin oak ..... *Quercus muehlenbergii*
- Post oak ..... *Quercus stellata*

Black locust ..... *Robinia pseudoacacia*

Black willow ..... *Salix nigra*

Basswood
- American basswood ..... *Tilia americana*

Elm
- American elm ..... *Ulmus americana*
- Siberian elm ..... *Ulmus pumila*
- Slippery elm ..... *Ulmus rubra*
- Rock elm ..... *Ulmus thomasii*

Other hardwoods
- Kentucky coffeetree ..... *Gymnocladus dioicus*
- Other unlisted or unknown hardwoods

[1] *Imported from neighboring States.*

TABLE TITLES

Table 1.—Number of active primary wood-using mills, Plains States, 1993

Table 2.—Industrial roundwood receipts by species group and mill type, Plains States, 1993

Table 3.—Industrial roundwood receipts by species group and State, Plains States, 1993

Table 4.—Industrial roundwood production by species group and type of product, Plains States, 1993

Table 5.—Industrial roundwood production by State and type of product, Plains States, 1993

Table 6.—Industrial roundwood production by species group and State, Plains States, 1993

Table 7.—Industrial roundwood movement by product, Plains States, 1993

Table 8.—Industrial roundwood movement by species group, Plains States, 1993

Table 9.—Industrial roundwood production, receipts, and movement by species group and State, Plains States, 1993

Table 10.—Timber removals for industrial roundwood by source of material and species group, Plains States, 1993

Table 11.—Timber removals for industrial roundwood by source of material and State, Plains States, 1993

Table 12.—Residues produced at primary wood-using mills by State, type of material, and type of use, Plains States, 1993

Table 1.--Number of active primary wood-using mills, Plains States, 1993

Kind of mill	Kansas mills	Nebraska mills	North Dakota mills	South Dakota mills	Total mills
Sawmills					
>5,000 MBF /1	1	2	--	2	5
1,000 to 5,000 MBF /1	2	10	1	3	16
<1,000 MBF /1	33	20	10	7	70
Total	36	32	11	12	91
Other mills /2	--	3	1	6	10
Total	36	35	12	18	101

1/ Thousand board feet per year, International 1/4-inch rule.

2/ Includes cabin log, post, pulp, shaving, and veneer mills.

Table 2.--Industrial roundwood receipts by species group and mill type, Plains States, 1993

(In thousand cubic feet)

Species group	Sawmills	Other mills 1/	All mills
SOFTWOODS			
Redcedar	122	119	241
Spruce	25	10	35
Ponderosa pine	14,062	835	14,897
Other pines	--	171	171
Other softwoods	--	8	8
Total	14,209	1,144	15,352
HARDWOODS			
Soft maple	168	--	168
River birch	1	--	1
Hickory	2	--	2
Pecan	2	--	2
Hackberry	279	--	279
Ash	242	--	242
Honeylocust	1	--	1
Black walnut	636	--	636
Osage-orange	1	--	1
Sycamore	17	--	17
Cottonwood	6,059	172	6,230
Aspen	1	--	1
Black cherry	*	--	*
Red oak group	246	--	246
White oak group	508	--	508
Black locust	1	--	1
Willow	1	--	1
Basswood	23	--	23
Elm	90	--	90
Other hardwoods	*	--	*
Total	8,278	172	8,449
All species	22,486	1,315	23,801

1/ Includes cabin log, post, pulp, shaving, and veneer mills.

* Less than 500 cubic feet.

Table 3.--Industrial roundwood receipts by species group and State, Plains States, 1993

(In thousand cubic feet)

Species group	Kansas	Nebraska	North Dakota	South Dakota	All States
SOFTWOODS					
Redcedar	12	225	--	4	241
Spruce	--	*	--	34	35
Ponderosa pine	*	843	5	14,049	14,897
Other pines	--	--	--	171	171
Other softwoods	--	--	--	8	8
Total	12	1,068	5	14,267	15,352
HARDWOODS					
Soft maple	158	10	--	--	168
River birch	1	--	--	--	1
Hickory	2	--	--	--	2
Pecan	2	--	--	--	2
Hackberry	258	20	--	--	279
Ash	181	51	8	2	242
Honeylocust	1	--	--	--	1
Black walnut	594	42	--	--	636
Osage-orange	1	1	--	--	1
Sycamore	17	--	--	--	17
Cottonwood	378	5,325	463	64	6,230
Aspen	--	--	1	--	1
Black cherry	*	--	--	--	*
Red oak group	191	56	--	--	246
White oak group	334	161	13	--	508
Black locust	1	--	--	--	1
Willow	*	1	--	--	1
Basswood	3	3	17	--	23
Elm	23	55	5	6	90
Other hardwoods	*	--	--	--	*
Total	2,145	5,725	507	72	8,449
All species	2,157	6,794	511	14,339	23,801

* Less than 500 cubic feet.

Table 4.--Industrial roundwood production by species group and type of product, Plains States, 1993

Species group	Saw logs		Veneer logs		Pulpwood		Posts		Cabin logs	Excelsior/ shavings	All products
	MBF 1/	MCF 2/	MBF 1/	MCF 2/	Cords 3/	MCF 2/	M pieces	MCF 2/	MCF 2/	MCF 2/	MCF 2/
SOFTWOODS											
Redcedar	574	122	--	--	--	--	--	--	--	119	241
Spruce	345	66	--	--	--	--	--	--	--	--	66
Ponderosa pine	99,669	16,478	--	--	10,800	810	33	21	4	--	17,314
Total	100,588	16,667	--	--	10,800	810	33	21	4	119	17,621
HARDWOODS											
Soft maple	1,231	195	--	--	--	--	--	--	--	3	198
Hard maple	3	*	--	--	--	--	--	--	--	--	*
River birch	7	1	--	--	--	--	--	--	--	--	1
Hickory	10	2	1	*	--	--	--	--	--	--	2
Pecan	12	2	--	--	--	--	--	--	--	--	2
Hackberry	1,616	257	--	--	--	--	--	--	--	--	257
Ash	1,302	222	31	7	--	--	--	--	--	--	229
Honeylocust	4	1	--	--	--	--	--	--	--	--	1
Black walnut	3,115	477	675	95	--	--	--	--	--	--	572
Osage-orange	8	1	--	--	--	--	--	--	--	--	1
Sycamore	111	18	--	--	--	--	--	--	--	--	18
Cottonwood	33,690	5,271	418	96	--	--	--	--	--	80	5,447
Aspen	3	1	--	--	--	--	--	--	--	--	1
Black cherry	8	1	--	--	--	--	--	--	--	--	1
Red oak group	1,387	248	124	28	--	--	--	--	--	--	276
White oak group	3,271	583	270	62	--	--	--	--	--	--	645
Black locust	4	1	--	--	--	--	--	--	--	--	1
Willow	8	1	--	--	--	--	--	--	--	--	1
Basswood	332	54	32	7	--	--	--	--	--	--	62
Elm	460	74	--	--	--	--	--	--	--	--	74
Other hardwoods	3	*	8	2	--	--	--	--	--	2	4
Total	46,586	7,411	1,560	297	--	--	--	--	--	85	7,794
All species	147,174	24,078	1,560	297	10,800	810	33	21	4	204	25,415

1/ Thousand board feet, International 1/4-inch rule.

2/ Thousand cubic feet.

3/ Standard cords are 128 cubic feet consisting of 79 cubic feet of wood and 49 cubic feet of bark and air space.

* Less than 500 cubic feet.

Table 5.--Industrial roundwood production by State and type of product, Plains States, 1993

State	Saw logs		Veneer logs		Pulpwood		Posts		Cabin logs	Excelsior/ shavings	All products
	MBF 1/	MCF 2/	MBF 1/	MCF 2/	Cords 3/	MCF 2/	M pieces	MCF 2/	MCF 2/	MCF 2/	MCF 2/
Kansas	12,458	2,029	937	161	--	--	--	--	--	10	2,201
Nebraska	52,717	8,626	623	136	--	--	--	--	--	194	8,955
North Dakota	2,610	458	--	--	--	--	--	--	4	--	462
South Dakota	79,389	12,965	--	--	10,800	810	33	21	--	--	13,796
All States	147,174	24,078	1,560	297	10,800	810	33	21	4	204	25,415

1/ Thousand board feet, International 1/4-inch rule.

2/ Thousand cubic feet.

3/ Standard cords are 128 cubic feet consisting of 79 cubic feet of wood and 49 cubic feet of bark and air space.

Table 6.--Industrial roundwood production by species group and State, Plains States, 1993

(In thousand cubic feet)

Species group	Kansas	Nebraska	North Dakota	South Dakota	All States
SOFTWOODS					
Redcedar	12	225	--	4	241
Spruce	--	*	--	66	66
Ponderosa pine	*	3,770	5	13,539	17,314
Total	12	3,995	5	13,609	17,621
HARDWOODS					
Soft maple	189	9	--	--	198
Hard maple	*	--	--	--	*
River birch	1	--	--	--	1
Hickory	2	*	--	--	2
Pecan	2	--	--	--	2
Hackberry	241	16	--	--	257
Ash	179	40	8	2	229
Honeylocust	1	--	--	--	1
Black walnut	476	96	--	--	572
Osage-orange	1	1	--	--	1
Sycamore	18	--	--	--	18
Cottonwood	416	4,438	413	180	5,447
Aspen	--	--	1	--	1
Black cherry	1	--	--	--	1
Red oak group	233	43	--	--	276
White oak group	382	249	13	--	645
Black locust	1	--	--	--	1
Willow	*	1	--	--	1
Basswood	25	20	17	--	62
Elm	17	46	5	6	74
Other hardwoods	4	*	--	--	4
Total	2,188	4,960	458	188	7,794
All species	2,201	8,955	462	13,796	25,415

* Less than 500 cubic feet.

Table 7.--Industrial roundwood movement by product, Plains States, 1993

(In thousand cubic feet)

Product	Production	(-)	Exports from region	(=)	Retained in region	(+)	Imports into region	(=)	Receipts
Saw logs	24,078		6,278		17,800		4,686		22,486
Other products 1/	1,336		221		1,116		200		1,315
All products	25,415		6,499		18,916		4,885		23,801

1/ Includes logs and bolts for cabin logs, posts, pulpwood, shavings, and veneer.

Table 8.--Industrial roundwood movement by species group, Plains States, 1993

(In thousand cubic feet)

Species group	Production	(-)	Exports from region	(=)	Retained in region	(+)	Imports into region	(=)	Receipts
SOFTWOODS									
Ponderosa pine	17,314		5,804		11,510		3,387		14,897
Other softwoods	307		41		265		189		455
Total	17,621		5,845		11,776		3,577		15,352
HARDWOODS									
Black walnut	572		269		303		332		636
Cottonwood	5,447		52		5,395		835		6,230
Oak	921		228		692		62		754
Other hardwoods	854		104		750		79		829
Total	7,794		653		7,140		1,309		8,449
All species	25,415		6,499		18,916		4,885		23,801

Table 9.--Industrial roundwood production, receipts, and movement by species group and State, Plains States, 1993

(In thousand cubic feet)

Species group and Destination	Production of industrial roundwood by State of origin											Total receipts
	Kansas	Nebraska	North Dakota	South Dakota	Iowa	Minnesota	Missouri	Montana	Oklahoma	Wyoming	Canada	
Ponderosa pine												
Kansas	*	--	--	--	--	--	--	--	--	--	--	*
Nebraska	--	843	--	--	--	--	--	--	--	--	--	843
North Dakota	--	--	5	--	--	--	--	--	--	--	--	5
South Dakota	--	1,876	--	8,786	--	--	--	683	--	2,705	--	14,049
Wyoming	--	1,051	--	4,753	--	--	--	--	--	--	--	--
Total production	*	3,770	5	13,539	--	--	--	683	--	2,705	--	14,897
Other softwoods												
Kansas	12	--	--	--	--	--	--	--	--	--	--	12
Nebraska	--	225	--	--	--	--	--	--	--	--	--	225
South Dakota	--	--	--	28	--	--	--	86	--	93	10	218
Wyoming	--	--	--	41	--	--	--	--	--	--	--	--
Total production	12	225	--	70	--	--	--	86	--	93	10	455
All softwoods												
Kansas	12	--	--	--	--	--	--	--	--	--	--	12
Nebraska	--	1,068	--	--	--	--	--	--	--	--	--	1,068
North Dakota	--	--	5	--	--	--	--	--	--	--	--	5
South Dakota	--	1,876	--	8,814	--	--	--	769	--	2,798	10	14,267
Wyoming	--	1,051	--	4,795	--	--	--	--	--	--	--	--
Total production	12	3,995	5	13,609	--	--	--	769	--	2,798	10	15,352
Black walnut												
Kansas	261	15	--	--	74	--	243	--	--	--	--	594
Nebraska	--	27	--	--	4	--	11	--	--	--	--	42
Indiana	1	--	--	--	--	--	--	--	--	--	--	--
Iowa	58	28	--	--	--	--	--	--	--	--	--	--
Missouri	156	26	--	--	--	--	--	--	--	--	--	--
Total production	476	96	--	--	79	--	254	--	--	--	--	636
Cottonwood												
Kansas	378	--	--	--	--	--	--	--	--	--	--	378
Nebraska	11	4,406	--	134	746	--	29	--	--	--	--	5,325
North Dakota	--	--	413	--	--	49	--	--	--	--	--	463
South Dakota	--	8	--	46	11	--	--	--	--	--	--	64
Missouri	27	25	--	--	--	--	--	--	--	--	--	--
Total production	416	4,438	413	180	757	49	29	--	--	--	--	6,230
Oak												
Kansas	516	--	--	--	--	--	--	--	9	--	--	524
Nebraska	10	153	--	--	19	--	34	--	--	--	--	217
North Dakota	--	--	13	--	--	--	--	--	--	--	--	13
Indiana	9	--	--	--	--	--	--	--	--	--	--	--
Iowa	2	2	--	--	--	--	--	--	--	--	--	--
Missouri	80	137	--	--	--	--	--	--	--	--	--	--
Total production	616	292	13	--	19	--	34	--	9	--	--	754
Other hardwoods												
Kansas	601	--	--	--	--	--	--	--	47	--	--	648
Nebraska	--	109	--	--	23	--	10	--	--	--	--	142
North Dakota	--	--	31	--	--	--	--	--	--	--	--	31
South Dakota	--	--	--	8	--	--	--	--	--	--	--	8
Indiana	3	--	--	--	--	--	--	--	--	--	--	--
Iowa	2	1	--	--	--	--	--	--	--	--	--	--
Missouri	75	24	--	--	--	--	--	--	--	--	--	--
Total production	681	134	31	8	23	--	10	--	47	--	--	829
All hardwoods												
Kansas	1,757	15	--	--	74	--	243	--	56	--	--	2,145
Nebraska	20	4,695	--	134	792	--	84	--	--	--	--	5,725
North Dakota	--	--	458	--	--	49	--	--	--	--	--	507
South Dakota	--	8	--	54	11	--	--	--	--	--	--	72
Indiana	13	--	--	--	--	--	--	--	--	--	--	--
Iowa	62	31	--	--	--	--	--	--	--	--	--	--
Missouri	337	211	--	--	--	--	--	--	--	--	--	--
Total production	2,188	4,960	458	188	877	49	327	--	56	--	--	8,449
All species												
Kansas	1,769	15	--	--	74	--	243	--	56	--	--	2,157
Nebraska	20	5,763	--	134	792	--	84	--	--	--	--	6,794
North Dakota	--	--	462	--	--	49	--	--	--	--	--	511
South Dakota	--	1,884	--	8,868	11	--	--	769	--	2,798	10	14,339
Indiana	13	--	--	--	--	--	--	--	--	--	--	--
Iowa	62	31	--	--	--	--	--	--	--	--	--	--
Missouri	337	211	--	--	--	--	--	--	--	--	--	--
Wyoming	--	1,051	--	4,795	--	--	--	--	--	--	--	--
Total production	2,201	8,955	462	13,796	877	49	327	769	56	2,798	10	23,801

* Less than 500 cubic feet.

Table 10.--Timber removals for industrial roundwood by source of material and species group, Plains States, 1993

(In thousand cubic feet)

Species group	Growing stock				Nongrowing stock							Total material used for products	Harvest residues	Total material harvested
	Used for products				Used for products									
	Sawtimber	Pole-timber	Logging residue	Total growing stock	Limbwood	Saplings	Cull trees	Dead trees	Nonforest trees	Logging slash	Total non-growing stock			
SOFTWOODS														
Redcedar	228.8	10.9	11.5	251.2	0.1	--	0.8	--	--	47.3	48.2	240.6	58.8	299.4
Spruce	61.7	2.1	1.9	65.6	2.5	--	*	--	--	8.2	10.8	66.3	10.1	76.4
Ponderosa pine	16,352.4	678.5	1,421.9	18,452.8	0.1	5.4	4.4	132.5	140.4	5,690.2	5,973.0	17,313.7	7,112.1	24,425.7
Total	16,642.9	691.4	1,435.3	18,769.6	2.7	5.4	5.2	132.5	140.4	5,745.7	6,032.0	17,620.6	7,181.0	24,801.6
HARDWOODS														
Soft maple	171.4	0.3	19.0	190.7	--	--	21.2	5.5	--	83.7	110.4	198.4	102.7	301.1
Hard maple	0.4	--	0.2	0.6	*	--	*	--	--	0.3	0.3	0.5	0.4	0.9
River birch	0.9	--	0.1	1.1	--	--	0.1	*	--	0.5	0.6	1.1	0.6	1.7
Hickory	1.9	--	0.7	2.6	*	--	0.1	--	--	1.1	1.3	2.1	1.8	3.9
Pecan	1.9	--	0.8	2.6	0.1	--	0.1	--	--	1.1	1.3	2.1	1.9	4.0
Hackberry	221.6	--	24.6	246.2	--	--	27.8	7.3	--	109.8	144.9	256.7	134.4	391.0
Ash	208.8	*	81.3	290.1	5.5	--	15.1	--	--	119.0	139.7	229.4	200.3	429.7
Honeylocust	0.6	--	0.3	0.9	*	--	*	--	--	0.4	0.5	0.7	0.7	1.4
Black walnut	481.2	--	44.5	525.7	8.7	--	12.8	--	69.5	222.5	313.5	572.1	267.0	839.1
Osage-orange	--	--	--	--	*	--	1.4	--	--	1.3	2.7	1.4	1.3	2.7
Sycamore	15.2	--	1.7	16.8	--	--	1.9	0.5	--	7.6	10.0	17.6	9.3	26.8
Cottonwood	5,377.7	41.6	834.5	6,253.9	15.8	--	11.8	--	--	2,368.3	2,395.9	5,447.0	3,202.8	8,649.8
Aspen	0.4	0.1	*	0.6	*	--	*	--	--	0.1	0.1	0.6	0.1	0.6
Black cherry	1.1	--	0.1	1.3	--	--	0.1	*	--	0.6	0.8	1.3	0.7	2.0
Red oak group	185.5	8.6	53.2	247.3	0.1	--	81.7	--	--	108.7	190.5	276.0	161.8	437.8
White oak group	436.3	19.8	123.9	580.0	0.4	--	188.2	--	--	243.4	432.0	644.8	367.3	1,012.0
Black locust	0.6	--	0.3	0.9	*	--	*	--	--	0.4	0.5	0.7	0.7	1.4
Willow	1.1	--	0.1	1.3	--	--	0.1	*	--	0.5	0.7	1.3	0.6	1.9
Basswood	54.9	1.0	7.4	63.3	0.5	--	4.4	1.1	--	24.4	30.3	61.8	31.8	93.6
Elm	64.3	0.6	8.1	73.1	0.3	--	7.1	1.8	--	28.3	37.5	74.1	36.4	110.5
Other hardwoods	4.0	0.2	0.5	4.7	*	--	*	--	--	1.1	1.1	4.2	1.6	5.8
Total	7,230.1	72.3	1,201.1	8,503.5	31.6	--	374.2	16.3	69.5	3,322.9	3,814.4	7,793.9	4,524.0	12,317.9
All species	23,873.0	763.7	2,636.4	27,273.1	34.3	5.4	379.4	148.8	209.9	9,068.6	9,846.4	25,414.5	11,705.0	37,119.5

* Less than 50 cubic feet.

Table 11.--Timber removals for industrial roundwood by source of material and State, Plains States, 1993

(In thousand cubic feet)

State	Growing stock				Nongrowing stock							Total material used for products	Harvest residues	Total material harvested
	Used for products				Used for products									
	Sawtimber	Pole-timber	Logging residue	Total growing stock	Limbwood	Saplings	Cull trees	Dead trees	Nonforest trees	Logging slash	Total non-growing stock			
Kansas	1,836.5	20.3	333.0	2,189.8	12.1	--	260.5	13.7	57.8	968.6	1,312.6	2,200.9	1,301.6	3,502.5
Nebraska	8,805.5	26.5	1,161.4	9,993.5	2.8	--	106.0	2.6	11.7	3,810.6	3,933.7	8,955.1	4,972.0	13,927.1
North Dakota	415.9	25.5	86.3	527.7	11.8	--	9.2	--	--	154.3	175.3	462.3	240.6	703.0
South Dakota	12,815.1	691.3	1,055.7	14,562.1	7.7	5.4	3.8	132.5	140.4	4,135.1	4,424.9	13,796.2	5,190.8	18,987.0
All States	23,873.0	763.7	2,636.4	27,273.1	34.3	5.4	379.4	148.8	209.9	9,068.6	9,846.4	25,414.5	11,705.0	37,119.5

Table 12.--Residues produced at primary wood-using mills by State, type of material, and type of use, Plains States, 1993

(In thousand tons, green weight)

State and Type of use	Wood residue						Bark	
	Total		Coarse 1/		Fine 2/			
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
Kansas								
Fiber products	--	7.93	--	7.93	--	--	--	--
Industrial fuel-mill	*	4.25	*	2.69	--	1.56	*	1.15
Industrial fuel-sold	--	0.46	--	--	--	0.46	--	0.34
Domestic fuel	0.08	6.18	0.07	5.70	*	0.48	0.02	1.73
Miscellaneous 3/	0.04	6.25	*	0.05	0.04	6.20	*	3.29
Not used	*	1.76	*	0.59	*	1.17	*	0.69
Total	0.12	26.84	0.08	16.96	0.05	9.87	0.02	7.19
Nebraska								
Industrial fuel-mill	1.48	0.64	0.94	0.40	0.55	0.23	0.24	0.17
Industrial fuel-sold	9.38	--	5.93	--	3.45	--	2.52	--
Domestic fuel	0.18	0.23	0.18	0.22	*	*	*	0.03
Miscellaneous 3/	1.11	62.42	0.72	39.02	0.39	23.40	0.30	17.12
Not used	0.66	14.52	0.41	10.09	0.25	4.43	0.13	3.75
Total	12.81	77.80	8.18	49.73	4.63	28.07	3.19	21.07
North Dakota								
Industrial fuel-mill	--	0.93	--	0.93	--	--	--	0.33
Domestic fuel	0.01	2.59	0.01	2.58	--	0.02	0.02	1.00
Miscellaneous 3/	--	2.03	--	--	--	2.03	--	*
Not used	0.02	0.60	--	0.38	0.02	0.22	--	0.32
Total	0.03	6.16	0.01	3.89	0.02	2.27	0.02	1.66
South Dakota								
Fiber products	125.21	--	101.54	--	23.68	--	--	--
Industrial fuel-mill	1.64	--	1.61	--	0.04	--	38.19	--
Industrial fuel-sold	0.03	--	0.01	--	0.02	--	3.29	--
Domestic fuel	2.88	0.30	2.56	0.19	0.32	0.11	0.54	0.08
Miscellaneous 3/	14.46	0.05	0.92	0.03	13.54	0.02	3.41	0.01
Not used	8.01	0.57	2.56	0.36	5.45	0.21	4.64	0.15
Total	152.23	0.92	109.19	0.58	43.04	0.34	50.09	0.25
All States								
Fiber products	125.21	7.93	101.54	7.93	23.68	--	--	--
Industrial fuel-mill	3.13	5.82	2.55	4.03	0.58	1.79	38.43	1.64
Industrial fuel-sold	9.41	0.46	5.94	--	3.47	0.46	5.82	0.34
Domestic fuel	3.15	9.30	2.83	8.69	0.33	0.61	0.58	2.84
Miscellaneous 3/	15.61	70.74	1.65	39.09	13.96	31.65	3.71	20.43
Not used	8.69	17.45	2.97	11.42	5.72	6.03	4.77	4.91
Total	165.20	111.71	117.46	71.16	47.73	40.55	53.31	30.17

1/ Suitable for chipping such as slabs, edgings, veneer cores, etc.

2/ Not suitable for chipping such as sawdust, veneer clippings, etc.

3/ Livestock bedding, mulch, small dimension, fuel pellets, and specialty items.

* Less than 5 green tons.

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May, Dennis M.
1996. **Plains States timber industry—an assessment of timber product output and use, 1993**. Resour. Bull, NC-178. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 26 p.

Reports findings of a survey of all primary wood-using mills in the Plains States (Kansas, Nebraska, North Dakota, South Dakota) in 1993, and compares findings with earlier surveys. Production and receipts of industrial roundwood are reported by product, species, and State. The quantity, type, and disposition of wood and bark residues generated by the primary wood-using industry of the Plains States are also reported.

KEY WORDS: Bark, mill, production, roundwood, residues, saw logs.

Our job at the North Central Forest Experiment Station is discovering and creating new knowledge and technology in the field of natural resources and conveying this information to the people who can use it. As a new generation of forests emerges in our region, managers are confronted with two unique challenges: (1) Dealing with the great diversity in composition, quality, and ownership of the forests, and (2) Reconciling the conflicting demands of the people who use them. Helping the forest manager meet these challenges while protecting the environment is what research at North Central is all about.